



**SHERWIN-WILLIAMS.**

THE SHERWIN-WILLIAMS COMPANY  
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June 19, 2008

Mr. Ray Klimcsak  
U.S. Environmental Protection Agency – Region 2  
290 Broadway 19<sup>th</sup> Floor  
New York, New York 10007-1866

RE: *Revised Submission of Sediment Sampling Results and Proposal to Conduct Deep Sediment Characterization - Kirkwood Lake*  
AOC Index Number: No. II CERCLA-02-99-2035  
Gibbsboro Borough, Voorhees Township and Lindenwold Borough, New Jersey

Dear Mr. Klimcsak:

This *Revised Submission of Sediment Sampling Results and Proposal to Conduct Deep Sediment Characterization - Kirkwood Lake* is being submitted in response to the June 5, 2008 comments provided by the United States Environmental Protection Agency (EPA) Region II New Jersey Remediation Branch to the April 18, 2008 *Submission of Sediment Sampling Results and Proposal to Conduct Deep Sediment Characterization - Kirkwood Lake*. A formal response to the USEPA comments is being provided under separate cover.

The Sherwin-Williams Company (Sherwin-Williams) has completed the scope of work proposed in the October 24, 2007 "Revised Kirkwood Lake Work Plan", approved by the EPA on October 1, 2007. As you may recall, this Work Plan underwent a number of revisions prior to receiving final approval. On October 31, 2007, Sherwin-Williams provided a formal response to the comment letters issued by EPA on August 29, 2007 and September 13, 2007, summarizing how all comments had been incorporated into the revised October 24, 2007 Work Plan.

### **Scope of Work**

The scope of work in the October 24, 2007 Work Plan consisted of collecting soil and sediment samples from seventeen transects within Kirkwood Lake and specified locations down stream of the Kirkwood Lake outfall. Surface water samples were also obtained and, during sediment sampling, the thickness of the fine-grained organic layer matter that comprises the upper sediment layer was measured. All samples were analyzed for Target Analyte List (TAL) Metals, polychlorinated biphenyls (PCBs) and polynuclear aromatic hydrocarbons (PAHs). The 2007 Kirkwood Lake sediment and soil sample locations are depicted on Figure 1.

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The EPA-approved 2007 Kirkwood Lake Work Plan stated that, after review of the fine-grained material analytical results, Sherwin-Williams would return to select locations and collect additional samples from the deeper coarse-grained material that forms the base of the lake. This letter provides to the EPA the results of the sediment sampling conducted pursuant to the approved 2007 Kirkwood Lake Work Plan and Sherwin-Williams' recommendations for additional characterization of the deeper coarse-grained material at Kirkwood Lake

Note that following collection and analysis of the deeper coarse-grained material samples, Sherwin-Williams will submit to the EPA a more detailed report, which will include the results of the soil and surface water sampling conducted at Kirkwood Lake, as well as the results of both phases of sediment sampling. This initial report of the results of the Kirkwood Lake sediment sampling is being provided to support selection of the locations where samples of the deeper coarse-grained material will be collected.

### **Sediment Sample Results**

The analytical results for all sediment samples are provided in Table 1. To assist in review of the results, the sediment data are further presented in the following figures:

Figures 2A and 2B: Analytical results for arsenic, lead, percent solids and total organic carbon are shown on cross-sections for each transect, as well as the proposed deeper coarse-grained sediment sampling.

Figures 3A and 3B: Analytical results for arsenic and lead are presented in a plan view, and are compared with their respective sediment and soil screening criteria<sup>1</sup>.

Figures 4A and 4B: All constituents detected in sediment at levels above their respective screening criteria are presented.

The percent solids and total organic carbon values are presented on Figures 2A and 2B because these results provide a qualitative indication of the type of sediment (fine-grained organic material or coarse-grained material) the sample was obtained in. A sample with low percent solids and high total organic levels was most likely collected from the fine-grained organic material that comprises the upper soft sediment layer, while a sample with high percent solids and low organic carbon levels was most likely collected from the deeper coarse-grained material. A similar analysis is supported by the grain size analysis. Samples consisting primarily of silts and clays, the more fine-grained materials, were most likely collected from the fine-grained organic material, while samples that are primarily gravel and sand were most likely collected from the deeper coarse-grained material.

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<sup>1</sup> Sediment screening criteria were originally proposed to the EPA in 2005 and consist of Low Effect Levels (LEL) presented in the NJDEP "Freshwater Sediment Screening Guidelines" (1998).

### **Sediment Distribution and Thickness**

As shown on Figures 2A and 2B, Kirkwood Lake is a shallow lake, with an average depth of two to three feet in the lake center. In many locations, the depth of the lake is one foot or less. The fine-grained organic material is approximately two to three feet thick throughout the majority of the lake. It is thinner or not present along much of the lake shore, where the lake is shallowest. The thickest accumulation of fine-grained organic material (4' – 5') is in the southern portion of the lake, upstream of the outfall to the Cooper River.

A relatively well-defined center channel runs north-south along the length of the lake. Within this channel, the deeper coarse-grained material forms a flat bottom, over which the fine-grained organic material has been deposited. The fine-grained organic material is thickest within the center channel, becoming significantly thinner at the shore of the lake.

### **Sediment Physical Characteristics**

The fine-grained organic sediment contains low levels of solids (12 – 20%) and a high organic carbon content (10 – 30%). The samples of the deeper coarse-grained material that were collected (KWDD0052AA-AB; KWDD0059AA-AB; KWDD0066AA-AB; others) contained significantly higher solids percentages (80 – 85%) and an organic carbon content of one percent or less.

### **Constituents Present in Sediment**

TAL metals were found at concentrations exceeding their respective screening criteria in the majority of sediment samples collected. Polynuclear aromatic hydrocarbons were also found at concentrations above screening criteria in a large number of locations. Polychlorinated biphenyls (aroclers 1254 and 1260) were found in a smaller number of samples.

Where found, the PAHs and PCBs were primarily in the shallowest intervals (AA-AB) sampled. Additionally, in the few locations where either PCBs or PAHs were found in a deeper sampling interval, the concentrations were typically near their respective screening criteria. Based on the frequency of detection, the generally lower concentrations of PAHs and PCBs as compared to metals, and the known tendency of both PAHs and PCBs to preferentially partition to organic carbon, it has been concluded that additional vertical delineation for either PAHs or PCBs in the coarse-grained sand and silt is unnecessary.

As shown on the attached figures, several metals were found in sediment at concentrations exceeding their respective screening criteria. In addition to lead and arsenic, these include cadmium, chromium, copper, mercury, nickel and zinc. These metals were found in all depth intervals below the 0.0 – 0.5 ft interval at levels above screening criteria. It has been concluded, therefore, that there is a need to perform vertical delineation in the deeper coarse-grained material for TAL Metals.

## Supplemental Characterization Proposal

Sherwin-Williams is proposing to return to 26 locations in Kirkwood Lake to collect samples of the coarser-grained sand and silt and an additional location along transect KDW-1, as requested by EPA. The locations have been chosen to provide an understanding of the distribution of constituents in the deeper coarse-grained material across the entire lake. As such, locations have been selected from each transect sampled pursuant to the approved 2007 Kirkwood Lake Work Plan. The proposed deeper samples will be collected from the center of the lake, the lake shoreline and intermediate locations. In contrast to the distribution of borings in Bridgewood Lake (see December 5, 2007 "Response to USEPA Comments dated November 15, 2007"), the majority of sampling locations proposed for Kirkwood Lake are in or near the lake center. The channel running through the center of the lake contains the majority of the sediment; therefore, sediment in the lake center locations has the greatest potential for transport of constituents from the fine-grained organic material into the deeper coarse-grained material.

The proposed sample locations, along with the Kirkwood Lake transect in which each is located, the boring number, the depth interval of the deepest sample obtained from each location, and the arsenic and lead concentrations in those deeper samples are presented below. The proposed sample locations are also presented on Figures 2A and 2B.

Transect	Boring	Bottom Interval <sup>1</sup>	As / Pb Concentration (mg/kg) <sup>2</sup>	Location <sup>3</sup>
KWT-1	New Boring	---	---	Center
KWT-2	KWDD0004	AG-AH	98.2 / 1150	Center
KWT-6	KWDD0012	AE-AF	194 / 3040	Center
KWT-10	KWDD0018	AA-AB	72.2 / 806	Intermediate
KWT-15	KWDD0022	AE-AF	194 / 3050	Center
	KWDD0024	AA-AB	116 / 1060	Shore
KWT-20	KWDD0025	AA-AB	37.4 / 274	Shore
	KWDD0028	AF-AG	96.4 / 938	Intermediate
KWT-23	KWDD0032	AH-AI	105 / 1640	Center
	KWDD0036	AD-AE	12.5 / 132	Shore
KWT-29	KWDD0038	AF-AG	40.7 / 809	Intermediate
	KWDD0041	AF-AG	304 / 3890	Intermediate
KWT-35	KWDD0043	AA-AB	59.5 / 284	Shore
	KWDD0048	AF-AG	177 / 3080	Center
KWT-40	KWDD0056	AE-AF	76.9 / 1720	Center
KWT-46	KWDD0060	AD-AE	71.9 / 2070	Intermediate
	KWDD0065	AE-AF	104 / 1190	Intermediate
KWT-50	KWDD0067	AD-AE	1.8 / 162	Shore/Inlet
	KWDD0073	AD-AE	264 / 4560	Center
KWT-54	KWDD0080	AE-AF	225 / 3900	Intermediate
	KWDD0085	AA-AB	0.9 / 19.9	Shore

KWT-58	KWDD0089	AF-AG	40.3 / 283	Center
KWT-62	KWDD0093	AA-AB	37.5/400	Shore
	KWDD0097	AA-AB	R <sup>4</sup> /1330	Intermediate
KWT-66	KWDD0101	AD-AE	R <sup>4</sup> / 5060	Center
KWT-70	KWDD0104	AD-AE	R <sup>4</sup> /1310	Shore
	KWDD0106	AD-AE	2.1/6.7	Center

1. Deepest interval in boring at which a sediment sample was obtained during the initial investigation.
2. Arsenic (As) and lead (Pb) concentration in sample from deepest interval.
3. Relative location of boring: "Center" refers to borings installed in or near the middle of the lake; "Shore" refers to borings installed at the lake shoreline; "Intermediate" refers to borings installed between the lake center and shoreline.
4. R = laboratory results were rejected.

Sherwin-Williams will collect the deep samples using a Vibracore™ sampling device. The depth to the deeper coarse-grained material is known at each proposed sampling location. The Vibracore™ will be advanced to the top of the deeper coarse-grained material, and a three-foot core of the deeper coarse-grained material will be collected. The three-foot core will be brought to the surface and an XRF unit will be used to screen the core at the 0.0-0.5 ft, 1.5-2.0 ft, and 2.5-3.0 ft intervals. Sample collection for laboratory analysis will be conducted as follows:

- If no metals are found at concentrations exceeding screening criteria or, in the case of arsenic, background levels, only the sample from the 0.0-0.5 ft interval will be collected for laboratory analysis.
- If the XRF screening finds one or more metals at concentrations greater than screening criteria or, in the case of arsenic, background levels, at the 0.0-0.5 ft interval, then the samples from both the 0.0-0.5 ft and 1.5-2.0 ft intervals will be collected for laboratory analysis.
- If the XRF screening finds one or more metals at concentrations greater than screening criteria, or in the case of arsenic, background levels, in the 1.5-2.0 ft interval, then the samples from all three intervals will be collected for laboratory analysis.

All samples collected for laboratory analysis will be analyzed for TAL metals, TOC grain size, and % solids.

### **Simultaneously Extracted Metals/Acid Volatile Sulfide Analysis**

Sherwin-Williams is also proposing to collect and analyze samples from six locations for simultaneously extracted metals/acid volatile sulfides (SEM/AVS). Sediment samples will be collected from the 0.0-0.5 ft intervals at locations KWDD0005, KWDD0018, KWDD0025, KWDD0036, KWDD0055, and KWDD0105. The intent is to develop an understanding of the SEM/AVS ratio over a range of metals and TOC levels. The rationale for and analytical procedures used for the SEM/AVS analysis were previously presented to

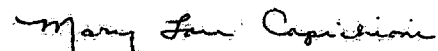
the EPA in the October 12, 2006 letter. All locations except KWDD-0105 are included in the deeper coring program. KWDD-0105 was selected because of the elevated lead levels (2520 mg/Kg and 3540 mg/Kg (dup)) found during the initial sampling.

The samples will be collected prior to the deeper sampling at each location. Adequate sample volumes will be collected to allow both an analysis for TAL metals and TOC, and SEM/AVS. The samples will be collected by the same procedures used during the first phase of sampling in Kirkwood Lake.

Following this investigation, Sherwin-Williams will prepare a comprehensive report presenting the all sediment, soil and surface water sampling results obtained from Kirkwood Lake.

The deeper coarse-grained sediment sampling in Kirkwood Lake will be initiated upon approval from EPA. We are available to discuss the proposed sampling protocols and locations at your convenience. Should you have any comments or questions, please do not hesitate to contact me at (216) 566-1794 or via e-mail at [mlcapichioni@sherwin.com](mailto:mlcapichioni@sherwin.com).

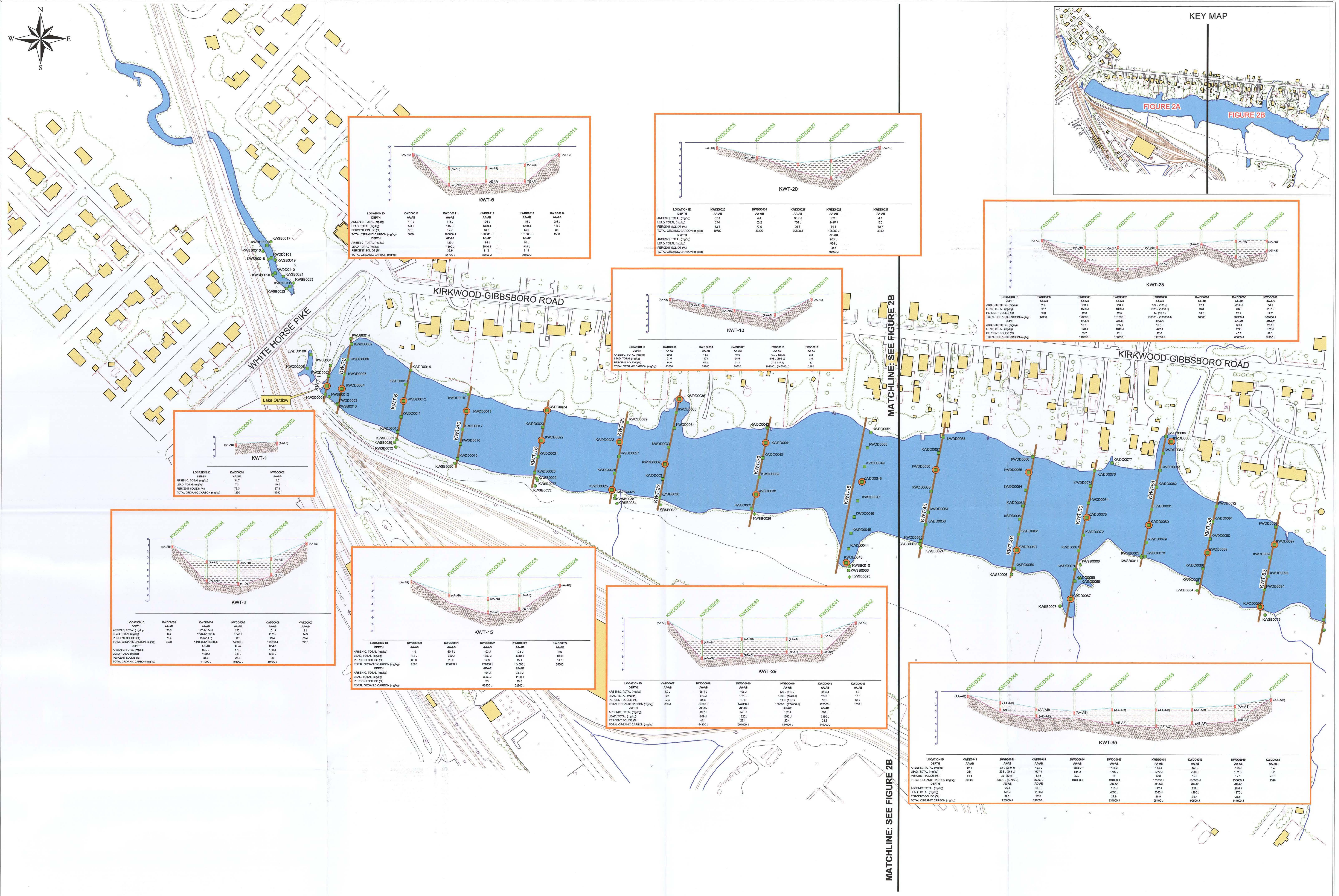
Sincerely,



Mary Lou Capichioni  
Director, Remediation Services

cc: C. Stern, USFWS  
J. Doyon, NJDEP (4 copies)  
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S. Jones, Weston  
H. Martin, ELM  
S. Clough, Weston





**BASEMAP LEGEND:**

- Soil Boring Location
- Sediment Boring Location
- Proposed Sediment Sample Location (Vertical Delineation)

**PROFILE LEGEND:**

- LAKE SURFACE
- TOP OF SEDIMENT LAYER
- SEDIMENT LAYER
- TOP OF CONSOLIDATED LAYER
- CONSOLIDATED LAYER
- SAMPLE LOCATION

**DEPTH INTERVAL KEY:**

Depth below sediment surface (in feet)

AA	0.0
AB	0.5
AC	1.0
AD	1.5
AE	2.0
AF	2.5
AG	3.0
AH	3.5
AI	4.0
AJ	4.5
AK	5.0

Vertical depth (feet) as noted on scale to left of each profile.

Horizontal distance not to scale. Use basemap for measurements.

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REPORT DATE:  
June 2008

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REVISION No.  
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WORK ORDER No.  
20076.022.077.0005

PROJECT MANAGER:  
S. Jones

CHECKED BY:  
A. Fischer

CONTRACT No.  
DELIVERY ORDER No.

DRAWN/MODIFIED BY:  
J. Lynes

DATE CREATED:  
06/18/2008

CLIENT NAME:  
The Sherwin-Williams Company

PROJECT NAME:  
Sherwin-Williams Gibbsboro Remedial Investigation

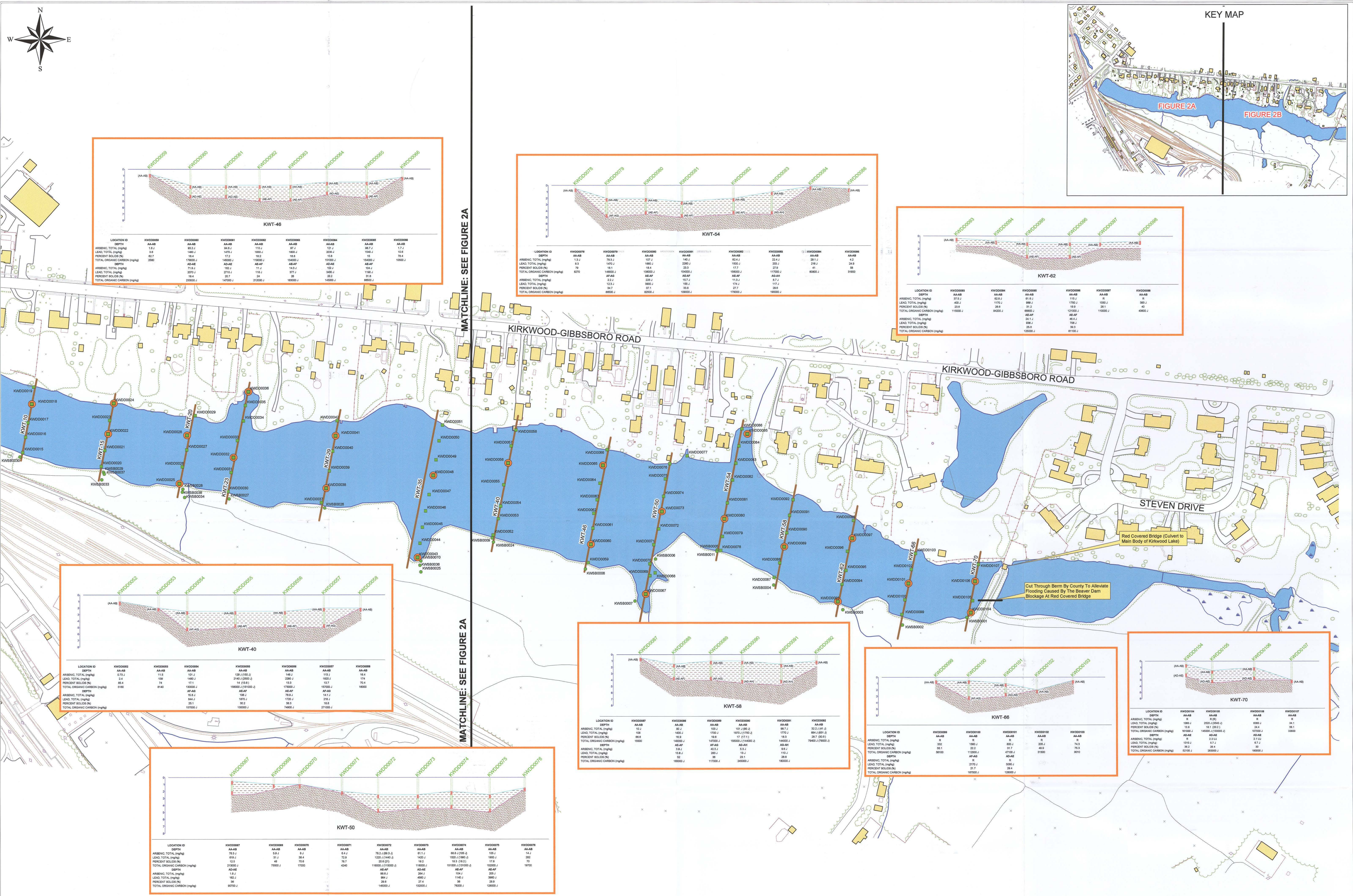
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SEDIMENT CROSS-SECTION  
PROFILE WITH ANALYTICAL RESULTS  
ARSENIC, LEAD, PERCENT SOLIDS,  
AND TOTAL ORGANIC CARBON ONLY  
OCTOBER AND NOVEMBER 2007**  
1 OF 2

FIGURE:  
2A

SCALE:  
1" = 100'

DATE:  
06/18/2008





**BASEMAP LEGEND:**

- Soil Boring Location
- Sediment Boring Location
- Proposed Sediment Sample Location (Vertical Delineation)

100 50 0 50 100  
Graphic Scale In Feet

**PROFILE LEGEND:**

- LAKE SURFACE
- TOP OF SEDIMENT LAYER
- SEDIMENT LAYER
- TOP OF CONSOLIDATED LAYER
- CONSOLIDATED LAYER
- BORING LOCATION
- SAMPLE LOCATION

Vertical depth (feet) as noted on scale to left of each profile.  
Horizontal distance not to scale. Use basemap for measurements.

**DEPTH INTERVAL KEY:**

Depth below sediment surface (in feet)

AA	- 0.0
AB	- 0.5
AC	- 1.0
AD	- 1.5
AE	- 2.0
AF	- 2.5
AG	- 3.0
AH	- 3.5
AI	- 4.0
AJ	- 4.5
AK	- 5.0

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**Sherwin-Williams**

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REVISION No. 0	CONTRACT No.	PROJECT NAME: Sherwin-Williams Gibbsboro Remedial Investigation
WORK ORDER No. 20076.022.077.0005	DELIVERY ORDER No.	
	DRAWN/MODIFIED BY: J. Lynes	
	DATE CREATED: 06/18/2008	

DRAWING TITLE:  
**KIRKWOOD LAKE TRANSECTS  
SEDIMENT CROSS-SECTION  
PROFILE WITH ANALYTICAL RESULTS  
ARSENIC, LEAD, PERCENT SOLIDS,  
AND TOTAL ORGANIC CARBON ONLY  
OCTOBER AND NOVEMBER 2007**

2 OF 2

FIGURE:  
2B

SCALE:  
1" = 100'

DATE:  
06/18/2008